Brammer Standard Company, Inc.

Provisional Certificate of Analysis

BS 181C

Certified Reference Material for High Manganese Stainless Steel (Nitronic 60) - UNS Number S21800

Analysis listed as percent by weight

	Estimated Analysis[1]			Estimated Analysis[1]	
Al	**0.010**	0.001	**N**	**0.15**	0.02
As	**<0.05**		**Nb**	**0.058**	0.006
B	**0.0007**	0.0001	**Ni**	**8.19**	0.08
C	**0.081**	0.008	**O**	**<0.05**	
Ca	**<0.005**		**P**	**0.028**	0.003
Co	**0.13**	0.01	**S**	**0.0009**	0.0001
Cr	**16.4**	0.9	**Si**	**4.22**	0.04
Cu	**0.39**	0.04	**Sn**	**0.012**	0.001
Fe	**[62.4]**	0.6	**Ti**	**0.009**	0.001
H	**<0.005**		**V**	**0.072**	0.007
Mn	**7.82**	0.08	**W**	**0.042**	0.004
Mo	**0.32**	0.03			

[1] The estimated value listed is the present best estimate of the true value. Values are given in weight percent.

Form: This CRM is machined in the form of a disc, approximately 38mm in diameter and 19mm thick by Brammer Standard Company, Inc.

A detailed final certificate of analysis will be supplied by November 4, 2028.

Brammer Standard Company, Inc., 14603 Benfer Road, Houston, TX 77069-2895 USA
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181C	Al	As	B	Be	Bi	C	Ca	Ce	Co	Cr	Cu	Fe	H	Mg
CSONH						0.0797							0.00054	
SAES	0.0096	0.0032	0.0007			0.0804			0.124	16.36	0.383	62.42		
GDS	0.0098		0.0007			0.0785	0.0007		0.131	16.43	0.393	62.42		
MTR	0.010					0.084			0.130	16.400	0.400			
Average	0.0098	0.0032	0.0007			0.08065	0.0007		0.128333	16.39667	0.392	62.42	0.00054	
Certificate	0.010	<0.05	0.0007			0.081	<0.005		0.13	16.4	0.39	[62.4]	<0.005	
Uncertainty	0.001		0.0001			0.008			0.01	0.9	0.04	0.6		

181C	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Si	Sn	Ta	Ti
CSONH			0.151			0.0023			0.00097					
SAES	7.7	0.284		0.0427	8.11		0.0258		0.0009		4.32	0.014		0.0082
GDS	7.78	0.328		0.0599	8.12		0.0269		0.0008		4.1			0.0075
MTR	7.970	0.340	0.150	0.070	8.340		0.032		0.001		4.240	0.009		0.010
Average	7.816667	0.317333	0.1505	0.057533	8.19	0.0023	0.028233		0.000918		4.22	0.0115		0.008567
Certificate	7.82	0.32	0.15	0.058	8.19	<0.05	0.028		0.0009		4.22	0.012		0.009
Uncertainty	0.08	0.03	0.02	0.006	0.08		0.003		0.0001		0.04	0.001		0.001

181C	V	W	Zn	Zr
CSONH				
SAES	0.0719	0.0353		
GDS	0.0732	0.0421		
MTR	0.070	0.050		
Average	0.0717	0.042467		
Certificate	0.072	0.042		
Uncertainty	0.007	0.004		

Homogeneity: This Certified Reference Material (CRM) was tested for homogeneity using ASTM Standard Method E826 and found acceptable. It was also examined by spark atomic emission spectrometry and found to be compatible with the following Reference Materials: BAS 468, 468/1, 472; BS 180A, 181A, 181B, 191; SRM 1297.

Validity statement: ISO Standard 33401 states that the certification should contain an expiration date for all materials where instability has been demonstrated or is considered possible, after which the certified value is no longer guaranteed by the certifying body. The certification of BS 181C is valid indefinitely. The certification is nullified if this CRM is damaged, contaminated, or otherwise modified.

Storage: This CRM must be stored in a cool, dry, non-corrosive environment

Source: The bar stock for this CRM was produced by Marcegaglia Stainless Richburg, LLC.; Richburg, SC.

Certified Area: The entire depth of the CRM may be used.

Caution: As with any bar material, avoid spark atomic emission spectrometric burns in the center of the CRM (5 mm radius), as some segregation may be present.

Sample Preparation: For best analytical results, use the same method for preparing the analytical surface on all reference materials as used for production specimens. Avoid overheating the sample during surface preparation.

Caution: CRM contains significant insoluble soft metal inclusions. Surface smearing may occur. Spark atomic emission spectrometers may require extended preburns to compensate.

Safety Notice: A Safety Data Sheet (SDS) is not required for this material. This material will not release or otherwise result in exposure to a hazardous chemical, under normal conditions of use. Inquiries concerning this Reference Material should be directed to:

Brammer Standard Co., Inc.
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Houston, Texas 77069-2895 USA

Phone: (281) 440-9396
Fax: (281) 440-4432

Web: www.brammerstandard.com
Email: contact@brammerstandard.com

Brammer Standard Company, Inc., is accredited by the American Association for Laboratory Accreditation (A2LA) to ISO Standard 17034:2016 as a Reference Material Producer for the production of Certified Reference Materials and Reference Materials (our current Certificate Number 656.02 expires 01/31/2027)

Brammer Standard Company's Chemical Laboratory is accredited by A2LA to ISO Standard 17025:2017. (Our current Certificate Number 656.01 expires 01/31/2027)

By current Certificate Number 10539 expiring 01/01/2027 the Quality System of Brammer Standard Company, Inc., is registered to ISO 9001:2015 by National Quality Assurance (NQA), U.S.A.

The scopes of accreditation are listed on the website: www.brammerstandard.com

References:

Versions used were those available at the time of testing and characterization

E826 Standard Practice for Testing Homogeneity of a Metal Lot or Batch in Solid Form by Spark Atomic Emission Spectrometry

E1019 Standard Test Methods for Determination of Carbon, Sulfur, Nitrogen, and Oxygen in Steel, Iron, Nickel, and Cobalt Alloys by Various Combustion and Fusion Techniques

E1806 Standard Practice for Sampling Steel and Iron for Determination of Chemical Composition

ISO Standard 17025:2017 General requirements for the competence of testing and calibration laboratories

ISO Standard 9001:2015 Quality Management Systems - Requirements

ISO 33400:2026 Reference materials - Vocabulary

ISO Standard 33401:2024 Reference materials - Contents of certificates, labels and accompanying documentation

ISO Standard 33403:2024 Reference materials – Requirements and recommendations for use

ISO Standard 17034:2016 General requirements for the competence of reference material producers

ISO Standard 33405:2024 Reference materials – Approaches for characterization and assessment of homogeneity and stability

ASTM documents available from ASTM, 100 Barr Harbor Dr., West Conshohocken, PA 19428.

*ISO Guides and Standards available from Global Engineering - **www.global.ihs.com***

Other useful documents available from NIST, U.S. Department of Commerce, Gaithersburg, MD 20899.

NIST Special Publication 260-100, Handbook for SRM Users

NIST Special Publication 829, Use of NIST Standard Reference Materials for Decisions on Performance of Analytical Chemical Methods and Laboratories

Certified by: _____ on November 4, 2026.

Beau R. Brammer

President